

Claims

1. An automatically shiftable motor vehicle transmission of planetary design, in particular an automatic transmission for a motor vehicle, encompassing an input drive shaft (1) and an output drive shaft (2) that are arranged in a housing (G); three single-carrier planetary gear sets (P1, P2, P3); at least six rotatable shafts (1, 2, 3, 4, 5, 6); and at least six shifting elements (03, 04, 05, 14, 15, 45, 24), encompassing brakes (03, 04, 05) and clutches (14, 15, 24, 45), selective engagement of which brings about various conversion ratios between the input drive shaft (1) and output drive shaft (2), so that at least seven forward speeds can be implemented; the input drive shaft (1) being continuously connected to the sun gear of the second planetary gear set (P1) and being connectable via a clutch (14) to the carrier of the first planetary gear set (P1) and being connectable via a clutch (15) to the shaft (5) which on the one hand is continuously connected to the sun gear of the first planetary gear set (P1) and on the other hand is couplable via a brake (05) to the housing (G); the output drive shaft (2) being continuously connected to the carrier of the third planetary gear set (P3) and to the ring gear of the first planetary gear set (P1); a shaft (3) being continuously connected to the sun gear of the third planetary gear set (P3) and being couplable by way of a brake (03) to the housing (G); a shaft (4) being continuously connected to the ring gear of the second planetary gear set (P2) and to the carrier of the first planetary gear set (P1), and being couplable via a brake (04) to the housing (G); a shaft (6) being continuously connected to the ring gear of the third planetary gear set (P3) and to the carrier of the second planetary gear set (P2); and a clutch (45, 24) being provided which releasably connects the shaft (4) to the shaft (5) or to the output drive shaft (2).

2. The automatically shiftable motor vehicle transmission as defined in Claim 1, wherein the shaft (4) is releasably connectable via the clutch (45, 24), in a region between the brake (04) and the carrier of the first planetary gear set (P1), to the shaft (5) or to the shaft (2).

3. The automatically shiftable motor vehicle transmission as defined in Claim 1 or 2, wherein by selective closing of the shifting elements (03, 04, 05, 14, 15, 45 or 24) seven forward speeds can be selected in such a way that for shifting from one speed into the next higher or next lower speed, of the shifting elements currently being actuated, in each case only one shifting element is opened and one further shifting element is closed.

4. The automatically shiftable motor vehicle transmission as defined in Claim 1, 2, or 3, wherein in the first forward speed the brakes (03, 04) are closed, in the second forward speed the brakes (03, 05), in the third forward speed the brake (03) and the clutch (45 or 24), in the fourth forward speed the brake (03) and the clutch (15), in the fifth forward speed in the third forward speed, the brake (03) and the clutch (14), in the sixth forward speed the clutches (14, 15), in the seventh forward speed the brake (05) and the clutch (14), and in a reverse gear the brake (04) and the clutch (15).

5. The automatically shiftable motor vehicle transmission as defined in one of the foregoing claims, wherein the planetary gear sets (P1, P2, P3) are embodied as minus planetary gear sets.

6. The automatically shiftable motor vehicle transmission as defined in one of the foregoing claims, wherein the clutches (14, 15, 45) are arranged, when viewed radially, above the planetary gear sets (P1, P2, P3).

7. The automatically shiftable motor vehicle transmission as defined in one of the foregoing claims, wherein the clutch (45), when viewed radially, is arranged slightly above the first planetary gear set (P1) and closer thereto than the clutches (14, 15).

8. The automatically shiftable motor vehicle transmission as defined in one of Claims 1 through 5, wherein the clutches (15, 45) are arranged on the side of the first planetary gear set (P1) that lies opposite the second planetary gear set (P2); and the clutch (14) is arranged axially between the first and second planetary gear set (P1, P2).

9. The automatically shiftable motor vehicle transmission as defined in one of Claims 1 through 5, wherein the clutches (14, 15, 24) are arranged on the side

of the first planetary gear set (P1) that lies opposite the second planetary gear set (P2).

10. The automatically shiftable motor vehicle transmission as defined in Claims 8 or 9, wherein the clutch (45 or 24) is arranged closer to the first planetary gear set (P1) than the clutch (15).

11. The automatically shiftable motor vehicle transmission as defined in one of Claims 1 through 5, wherein the clutch (45 or 24) is adjacent to the first planetary gear set (P1).

12. The automatically shiftable motor vehicle transmission as defined in one of the foregoing claims, wherein for the case of disc clutches, the outer disc carriers of the clutches (14, 15, 24, 45) are arranged on the input drive side.

13. The automatically shiftable motor vehicle transmission as defined in one of the foregoing claims, wherein the brake (03) are arranged on the side of the third planetary gear set (P3) that lies opposite the second planetary gear set (P2).

14. The automatically shiftable motor vehicle transmission as defined in one of the foregoing claims, wherein the brake (04) and/or the brake (05) is arranged, when viewed radially, above the planetary gear sets (P1, P2, P3).

15. The automatically shiftable motor vehicle transmission as defined in Claim 14, wherein the brake (05) is arranged closer to the first planetary gear set (P1) than the brake (04).

16. The automatically shiftable motor vehicle transmission as defined in Claim 14 or 15, wherein the clutch (45 or 24) is arranged axially between the brake (05) and the clutch (15).

17. The automatically shiftable motor vehicle transmission as defined in one of the foregoing claims, wherein the brake (04) and/or the brake (05) is arranged on the side of the first planetary gear set (P1) that lies opposite the second planetary gear set (P2).

18. The automatically shiftable motor vehicle transmission as defined in Claim 17, wherein the brake (04) is arranged closer to the first planetary gear set (P1) than the brake (05).

19. The automatically shiftable motor vehicle transmission as defined in one of the foregoing claims, wherein the clutches (15, 45) are arranged adjacent to one another.

19. The automatically shiftable motor vehicle transmission as defined in one of the foregoing claims, wherein at least one additional freewheel is provided between one of the shafts (1, 2, 3, 4, 5, 6) and the housing (G).

20. The automatically shiftable motor vehicle transmission as defined in one of the foregoing claims, wherein the input drive (AN) and output drive (AB) of the transmission are arranged coaxially with one another.

21. The automatically shiftable motor vehicle transmission as defined in one of Claims 1 through 19, wherein the input drive (AN) and output drive (AB) of the transmission are not arranged coaxially with one another, in particular the input drive (AN) and output drive (AB) extend axially parallel or at an angle to one another.

22. The automatically shiftable motor vehicle transmission as defined in Claim 21, wherein the input drive (AN) and output drive (AN) are provided on the same side of the housing (G).

23. The automatically shiftable motor vehicle transmission as defined in one of the foregoing claims, wherein any axial differential or a center differential is arranged on the input drive side or the output drive side of the transmission.

24. The automatically shiftable motor vehicle transmission as defined in one of the foregoing claims, wherein the input drive shaft (1) is separable from a drive engine by way of a clutch element or a conversion element.

25. The automatically shiftable motor vehicle transmission as defined in Claim 24, wherein a hydrodynamic converter, a differential converter, an initial movement retarder, a hydrostatic transmission, an electric transmission, an electromechanical transmission, or a hydrodynamic clutch, a dry initial movement clutch, a wet initial movement clutch, a magnetic powder clutch, or a centrifugal clutch is provided as the conversion element or clutch element.

26. The automatically shiftable motor vehicle transmission as defined in one of the foregoing claims, wherein an initial movement element can be arranged

after the transmission in the power flow direction, the input drive shaft (1) being connected in fixed fashion to the crankshaft of the engine.

27. The automatically shiftable motor vehicle transmission as defined in Claim 26, wherein initial movement is accomplished by means of a shifting element (04) integrated into the transmission.

28. The automatically shiftable motor vehicle transmission as defined in one of the foregoing claims, wherein the clutch (24) with which the shaft (4) is connectable to the output drive shaft (2) constitutes, together with the brake (04), a hill holder for the transmission in order to immobilize the output drive shaft (2) on the housing (G).

29. The automatically shiftable motor vehicle transmission as defined in one of the foregoing claims, wherein a wear-free brake can be arranged on each shaft.

30. The automatically shiftable motor vehicle transmission as defined in one of the foregoing claims, wherein a power takeoff can be arranged on each shaft in order to drive additional accessories.

31. The automatically shiftable motor vehicle transmission as defined in Claim 30, wherein the input drive (AN) of the transmission and the power takeoff are arranged on the same side of the transmission or of the housing (G).

32. The automatically shiftable motor vehicle transmission as defined in one of the foregoing claims, wherein the shifting elements (03, 04, 05, 14, 15, 45, 24) are embodied as on-load shifting clutches or brakes.

33. The automatically shiftable motor vehicle transmission as defined in Claim 32, wherein disc clutches, band brakes, and/or cone clutches are usable.

34. The automatically shiftable motor vehicle transmission as defined in one of the foregoing claims, wherein an electrical machine can additionally be mounted on any shaft as a generator and/or as an additional input drive machine.